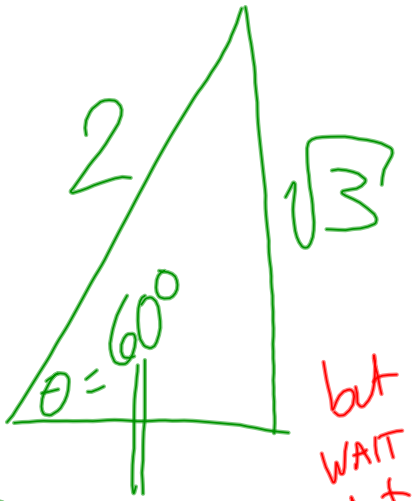
4.4/3

Given that $\theta = \sin^{-1}\left(-\frac{1}{2}\sqrt{3}\right)$ find the exact values of ....



1) find $\sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$

$\theta = \frac{\pi}{3}$.

$\frac{60}{180} = \frac{1}{3}$ $\frac{\pi}{3}$

but WAIT what about

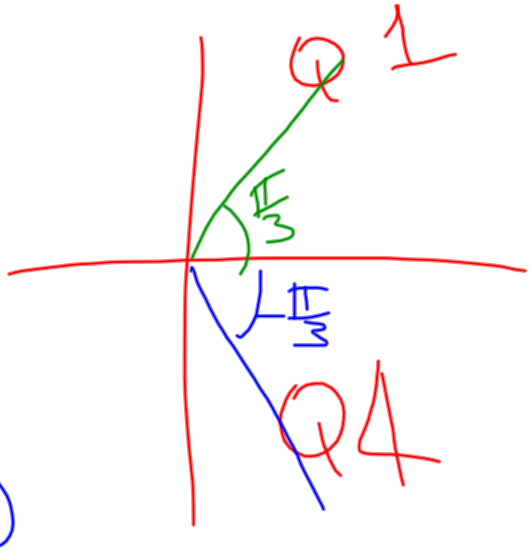
2) what is the "related" angle to $\frac{\pi}{3}$ that is in the range of $\sin^{-1}x$?

~~$\sin^{-1}$~~ $\sin^{-1}(x)$

$[-1,1] \to \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

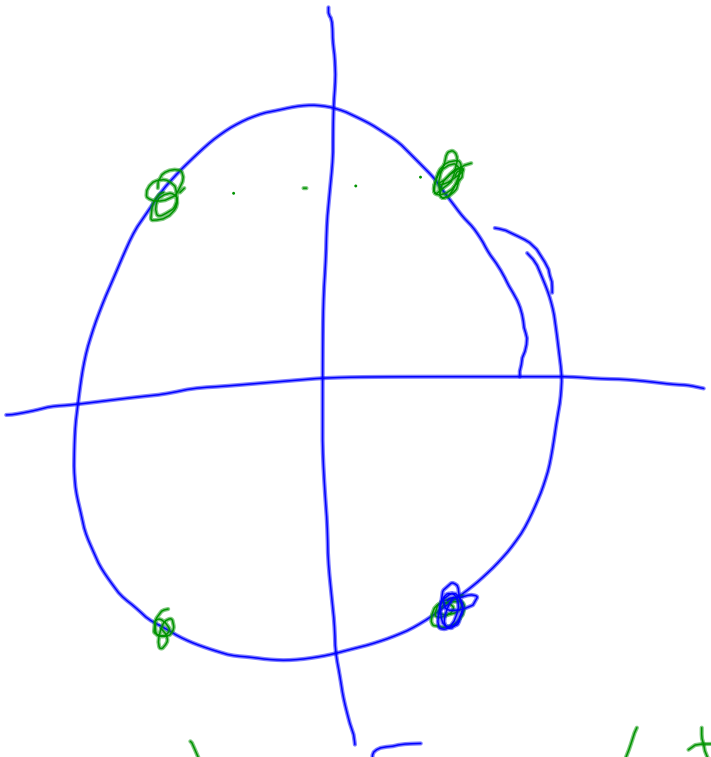
$[-1,0] \xrightarrow{\sin^{-1}} \left[-\frac{\pi}{2}, 0\right]$

$[0,1] \to \left[0, \frac{\pi}{2}\right]$



③

$\therefore \sin^{-1}\left(-\frac{\sqrt{3}}{2}\right) = -\frac{\pi}{3}$

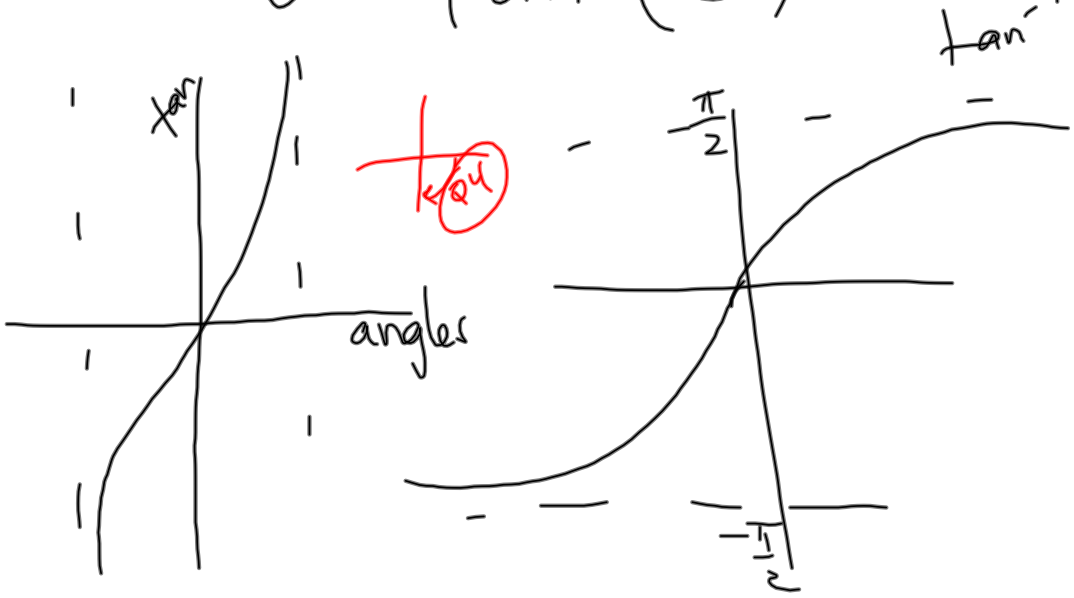


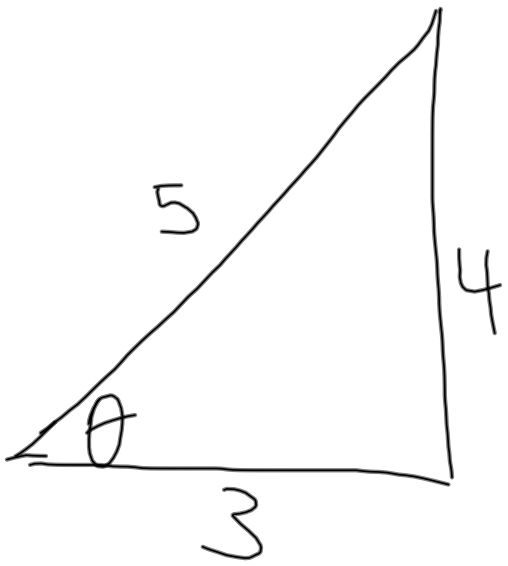
$\sin\left(-\frac{\pi}{3}\right) = -\frac{\sqrt{3}}{2}$ $\csc\left(-\frac{\pi}{3}\right) = -\frac{2}{\sqrt{3}}$

$\cos\left(-\frac{\pi}{3}\right) = +\frac{1}{2}$ $\sec\left(-\frac{\pi}{3}\right) = 2$

$\tan\left(-\frac{\pi}{3}\right) = -\sqrt{3}$ $\cot\left(-\frac{\pi}{3}\right) = -\frac{1}{\sqrt{3}}$

$$\theta = \tan^{-1}\left(\frac{4}{3}\right)$$





$$\sin\theta = \frac{4}{5}$$

$$\cos\theta = \frac{3}{5}$$

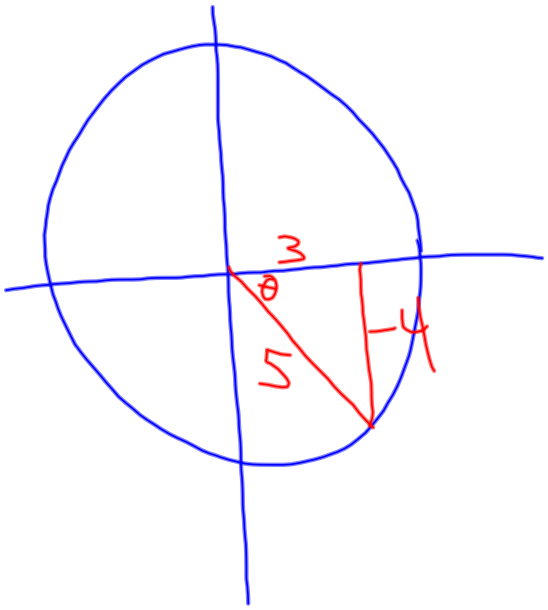
$$\tan\theta = \frac{4}{3}$$

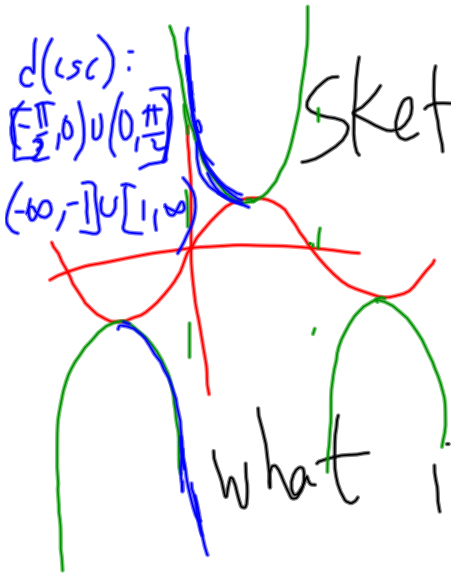
given that $\theta = \tan^{-1}\left(-\frac{4}{3}\right)$...

$\sin\theta = -\frac{4}{5}$

$\cos\theta = \frac{3}{5}$

$\tan = -\frac{4}{3}$





Sketch the graph of $\csc(x)$.

What is the "principal branch"?

What are domain & range of $\csc^{-1}(x)$.

A) $\cos(\tan^{-1}x)$

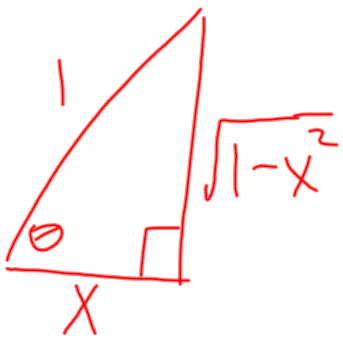
$\tan\theta = \frac{x}{1}$

$= \frac{1}{\sqrt{x^2+1}}$

b) $\tan(\cos^{-1}x)$

$\cos\theta = \frac{x}{1}$

$= \frac{\sqrt{1-x^2}}{x}$



8c) $\cos^{-1}\left(\cos\left(\frac{12\pi}{7}\right)\right)$ $\frac{12\pi}{7} - \frac{7\pi}{7} =$

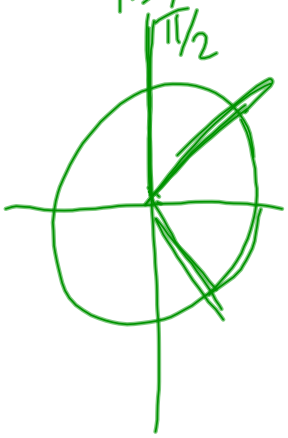
$0 \leq x \leq \pi$ $\frac{2\pi}{7}$ $\frac{5\pi}{7}$

8d) $\cos^{-1}(\cos 200)$ $\frac{200}{2\pi}$ $\frac{100}{\pi}$

31.83

IIII Q

$1.570 \leq X \leq \pi$

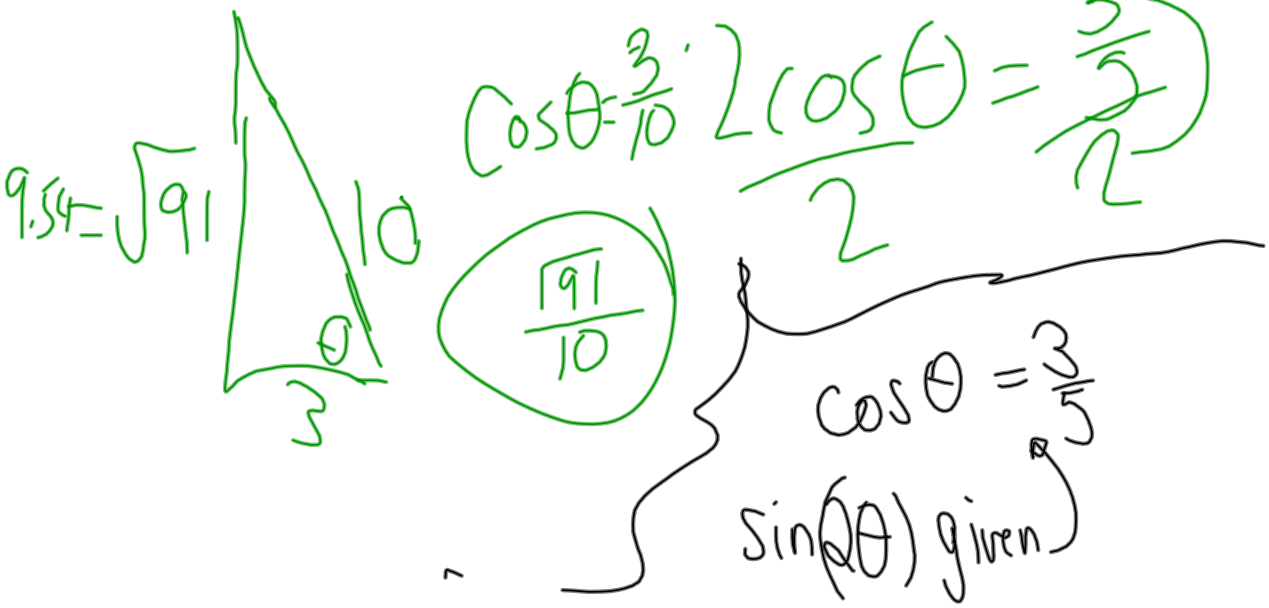


$= 64\pi - 200$ $\frac{100}{\pi} - \frac{\pi}{11}$

1.06

11) $\sin\left[2\cos^{-1}\left(\frac{3}{5}\right)\right]$

~~$2\cos\theta = \frac{3}{5}$~~



11) $\sin\left(2\cos^{-1}\left(\frac{3}{5}\right)\right)$

$\sin(2\theta) = 2\sin\theta\cos\theta$

$\sin(\theta+\beta) = \sin\theta\cos\beta + \sin\beta\cos\theta$

$2\sin\left(\cos^{-1}\left(\frac{3}{5}\right)\right)\cos\left(\cos^{-1}\left(\frac{3}{5}\right)\right)$

If $\cos^{-1}\left(\frac{3}{5}\right) = \theta$
then
$\cos\theta = \frac{3}{5}$

$= 2\left(\frac{4}{5}\right)\left(\frac{3}{5}\right)$

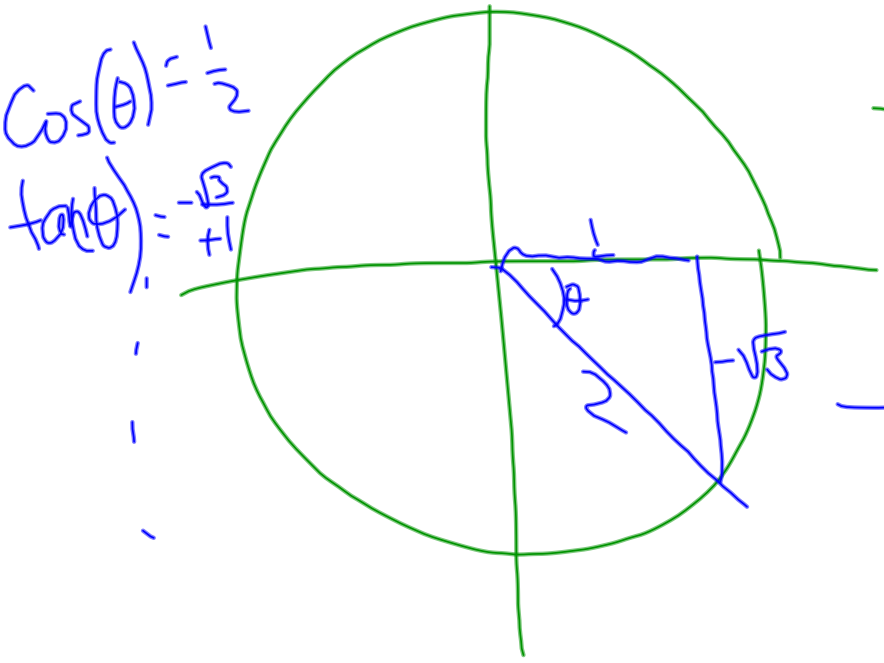
$= \frac{24}{25}$

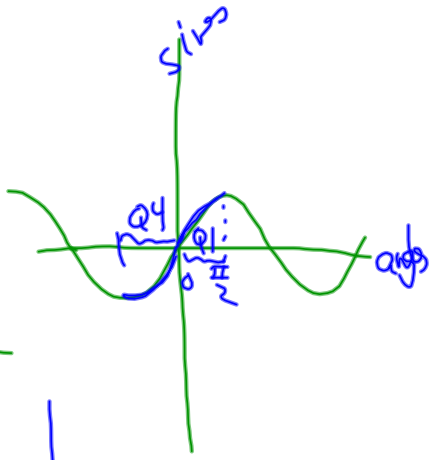
3) given $\theta = \sin^{-1}\left(-\frac{\sqrt{3}}{2}\right)$

find $\sin\theta, \cos\theta, \ldots$

$\cos(\theta) = \frac{1}{2}$

$\tan(\theta) = \frac{-\sqrt{3}}{+1}$





* Draw a graph of $\csc x$.

* Determine the "principal branch" of $\csc x$ that you would use for a 1-1 piece of $\csc x$.

* Use this to determine domain & range of $\csc^{-1}(x)$